

X
Work Order ID 92611

92611

Page 1

November-05-12 7:10:31 AM

Item ID: D212-664-207TRN

Accept

N900040100

Setup

Start

NS1

Revision ID:

Item Name: Crosstube Turning Detail

Stop

NS2

Start Date: 11/05/12 Start Qty: 1.00 *1*

Cust Item ID:

Required Date: 11/09/12 Req'd Qty: 1.00 *1*

Customer:

Reference:

Approvals: Process Plan: U Date: _____ Tooling: _____ Date: _____ Run Start *NR1*
QC: _____ Date: _____ SPC (Y/N): _____ Stop *NR2*

| Sequence ID/ Work Center ID | Operation Description | Set Up/ Run Hours | Tool ID | Tool # | Plan Code | Accept Qty | Reject Qty | Reject Number | Insp. Stamp |
|--------------------------------|--------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|
|--------------------------------|--------------------------|----------------------|---------|--------|--------------|---------------|---------------|------------------|----------------|

| | | | | | | | | | |
|--------------|--------------|--|--|--|--|--|--|--|--|
| Draw Nbr | Revision Nbr | | | | | | | | |
| D212-664-247 | Rev B (DEO) | | | | | | | | |

100 0.00

100 MORI SEIKI CNC LATHE LARGE

Mori Seiki Memo 0.00

Mori Seiki CNC Lathe Large 1-Fill tube with sand & install plugs DT8534 on both ends as per Folio FA706
2-Turn first side as per Folio FA706

3- File transition lines smooth.

FOLIO REV: A

DWG REV: B

1 Q

m.m.l
12/11/06

110 0.00

110 QC Memo 0.00

Quality Control

1 Q

m.m.l
12/11/06

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Page 2

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Approvals: Process Plan:

Date:

Tooling:

Date:

Run Start

NR1

QC:

Date:

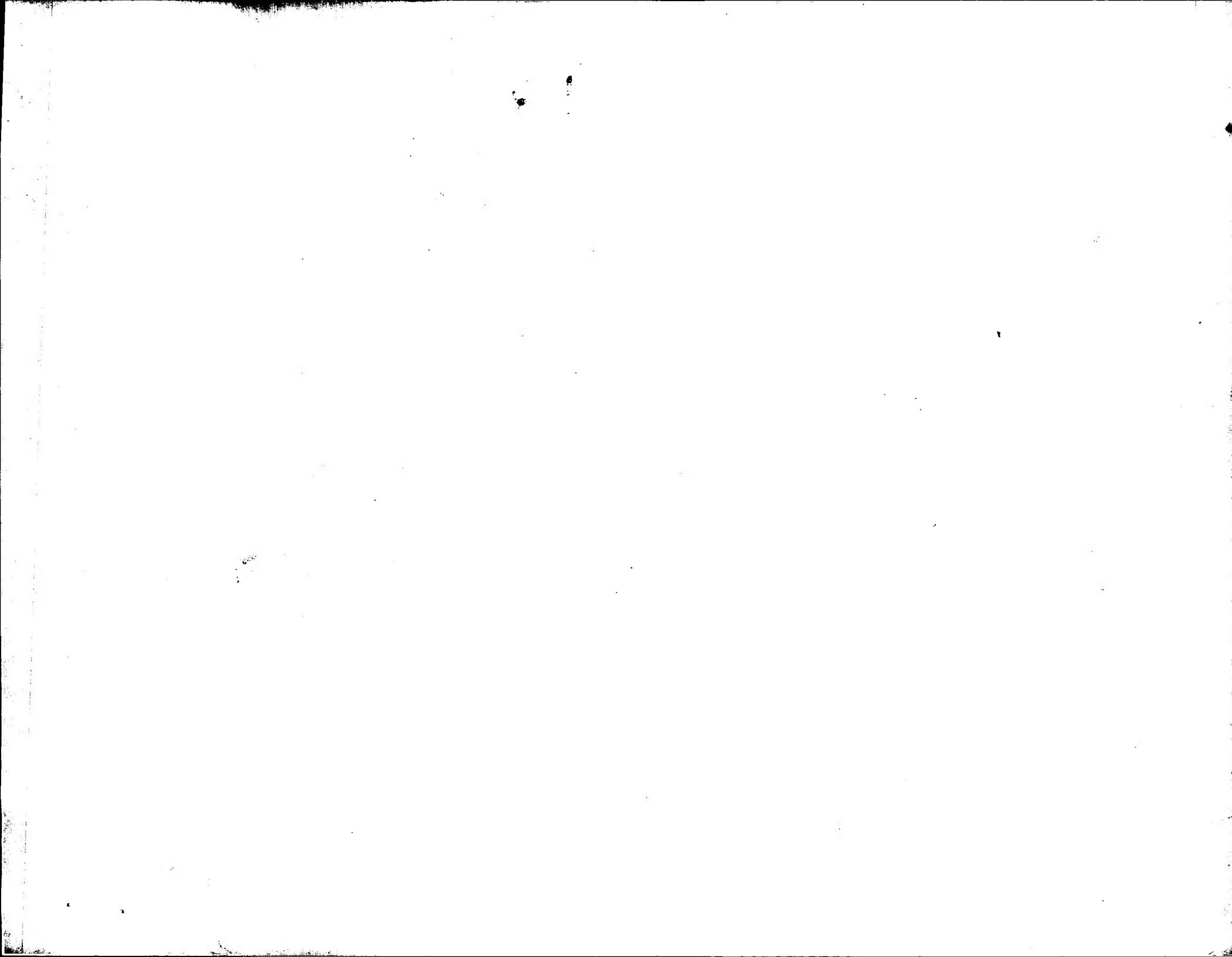
SPC (Y/N):

Date:

Stop

NR2

| Sequence ID/ Work Center ID | Operation Description | Set Up/ Run Hours | Tool ID | Tool # | Plan Code | Accept Qty | Reject Qty | Reject Number | Insp. Stamp |
|-----------------------------------|--|----------------------|---------|--------|--------------|---------------|---------------|------------------|---------------------------|
| 120 *120* Mori Seiki | MORI SEIKI CNC LATHE LARGE | 0.00 | | | | 1 | Ø | | <i>mori l</i> 12/11/06 |
| Mori Seiki CNC Lathe Large | Memo 1-Turn second side as per Folio FA706 2- File transition lines smooth. 3-Remove sand and plugs FOLIO REV: <u>A</u> DWG REV: <u>B</u> | 0.00 | | | | | | | |
| 130 *130* QC | QC1- Inspect dimensions to dimension sheet | 0.00 | | | | 1 | Ø | | <i>mori l</i> 12/11/06 |
| Quality Control | Memo | 0.00 | | | | | | | |
| 140 *140* QC | QC8- Inspect parts - second check | 0.00 | | | | JW | 12-11-8 | | |
| Quality Control | Memo | 0.00 | | | | | | | |



Work Order ID 92611

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Page 3

November-05-12 7:10:31 AM

Item ID: D212-664-207TRN

Accept

N900040100

Setup

Start

NS1

Revision ID:

Item Name: Crosstube Turning Detail

Stop

NS2

Start Date: 11/05/12 Start Qty: 1.00

1

Cust Item ID:

Required Date: 11/09/12 Req'd Qty: 1.00

1

Customer:

Reference:

Approvals: Process Plan:

Date: Tooling:

Date:

Run

Start

NR1

QC:

Date: SPC (Y/N):

Date:

Stop

NR2

Sequence ID/
Work Center ID

Operation
Description

Set Up/
Run Hours

Tool ID

Tool #

Plan
Code

Accept
Qty

Reject
Qty

Reject
Number

Insp.
Stamp

145

145

Crosstubes

Crosstubes

Memo

0.00

JW 12-11-9

GRIND ONLY TRANSITION LINES SMOOTH LONGITUDE WAY.

150

150

HandFXtube

Hand Finishing Crosstubes

Memo

0.00

1- PRESSURE WASH X-TUBE INSIDE AND OUT

2- ACID ETCH X-TUBE INSIDE AND OUT. USE RED SCOTCH BRITE

160

QC5- Inspect part completeness to step on W/O

0.00

DAS

16

9-09

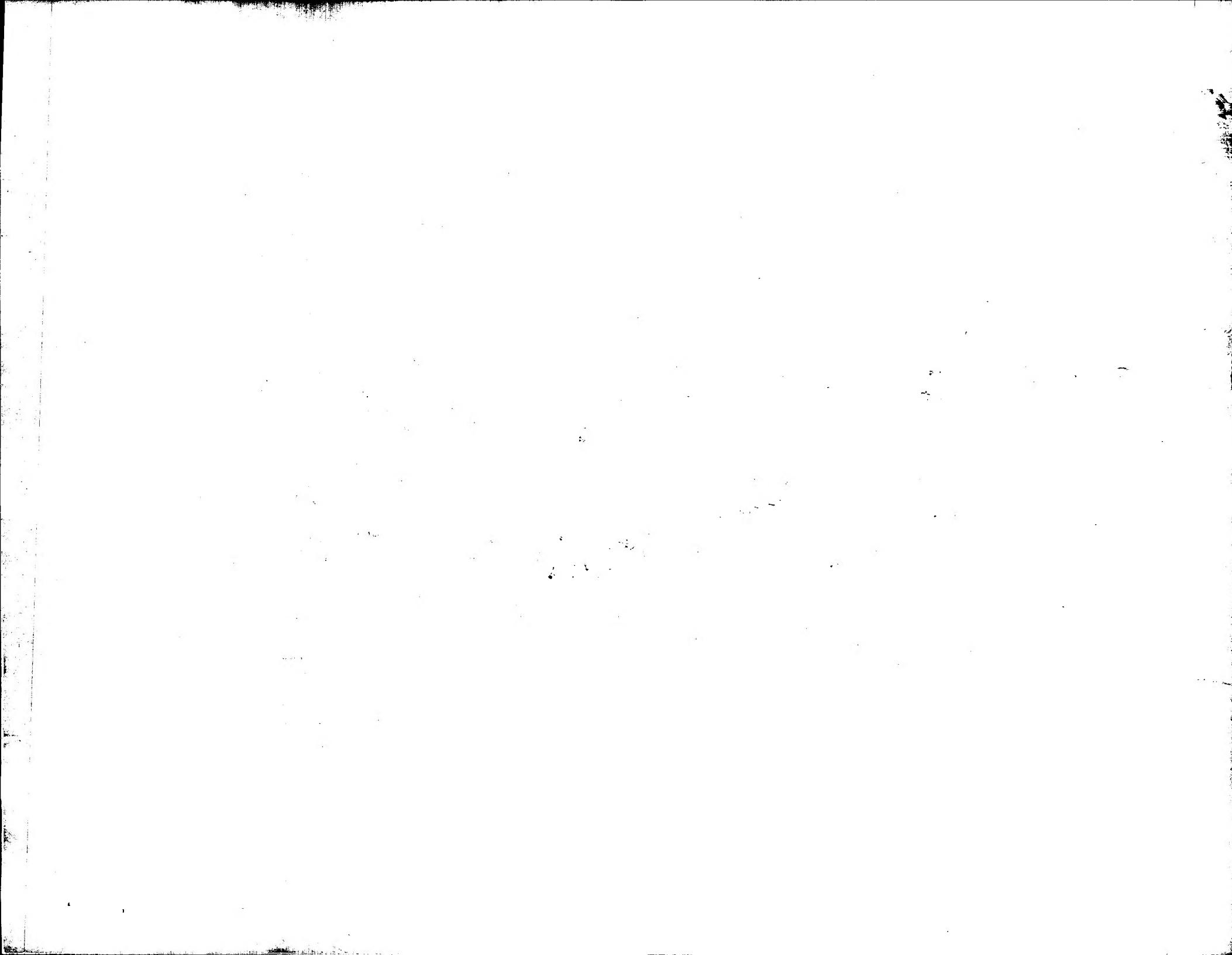
11/11/12

160

QC

Quality Control

M6 / RM 12-11-12



Work Order ID 92611

92611

Page 4

November-05-12 7:10:31 AM

Item ID: D212-664-207TRN

Accept

N900040100

Setup

Start

NS1

Revision ID:

Item Name: Crosstube Turning Detail

Stop

NS2

Start Date: 11/05/12 **Start Qty:** 1.00 ***1***

Cust Item ID:

Required Date: 11/09/12 **Req'd Qty:** 1.00 ***1***

Customer:

Reference:

Approvals: Process Plan:

Date:

Tooling:

Date:

Run

Start

NR1

QC:

Date:

SPC (Y/N):

Date:

Stop

NR2

**Sequence ID/
Work Center ID**

**Operation
Description**

**Set Up/
Run Hours**

Tool ID

Tool #

**Plan
Code**

**Accept
Qty**

**Reject
Qty**

**Reject
Number**

**Insp.
Stamp**

170

170

Packaging

Packaging

0.00

Rm 12-11-12

Packaging

Memo

0.00

Identify and stock in kanban rack
Location: LC

180

180

QC

QC21- Final Inspection - Work Order Release

0.00

Quality Control

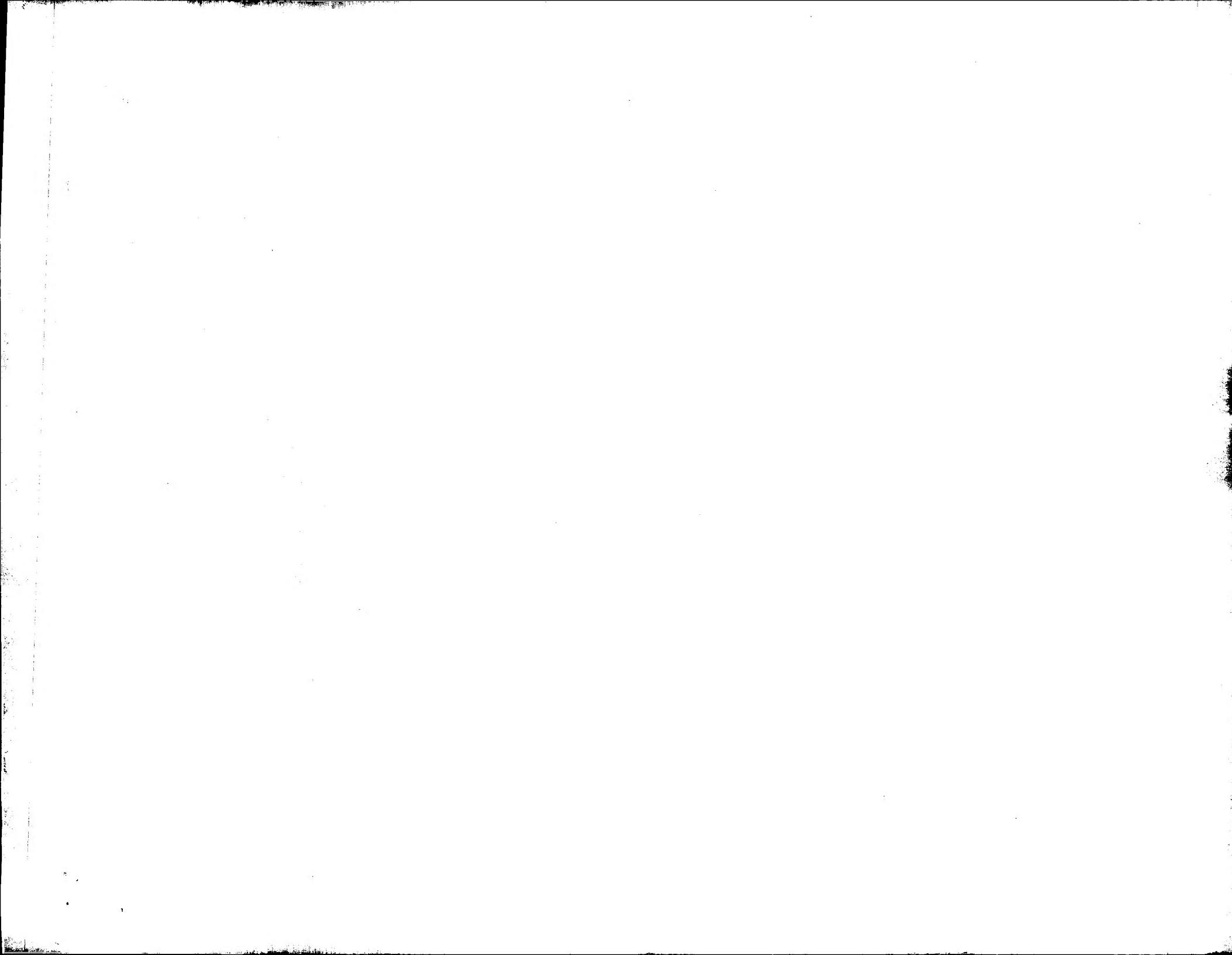
Memo

0.00

12/11/13 (J)

MF

12-11-12



Picklist Print

November-05-12 7:10:30 AM

Page 1

Work Order ID: 92611**Parent Item:** D212-664-207TRN**Parent Item Name:** Crosstube Turning Detail**Start Date:** 11/05/12**Required Date:** 11/09/12**Start Qty:** 1.00**Required Qty:** 1.00**Comments:** IPP Rev:A New Issue 08-03-06 DD verified by:ec
IPP Rev B 08.04.02 Removed polish EC verified DD

| Component Item ID/ Item Name | Replacement Item ID | Mfg/ Purch | Bin Item | Primary Location | Last Location | Route Seq ID | Unit of Measure | Qty on Hand | Qty per Kit | Total Qty | Qty Issued | Date Issued | Status |
|----------------------------------|------------------------|---------------|-------------|---------------------|------------------|-----------------|--------------------|----------------|-------------|--------------|---------------|----------------|--------|
| D6008-132 Crosstube extrusion | | Manufactured | No | | | 110 | Each | 0.0000 | 1 | 1 | | | |

69799 | mm, L 12/11/05

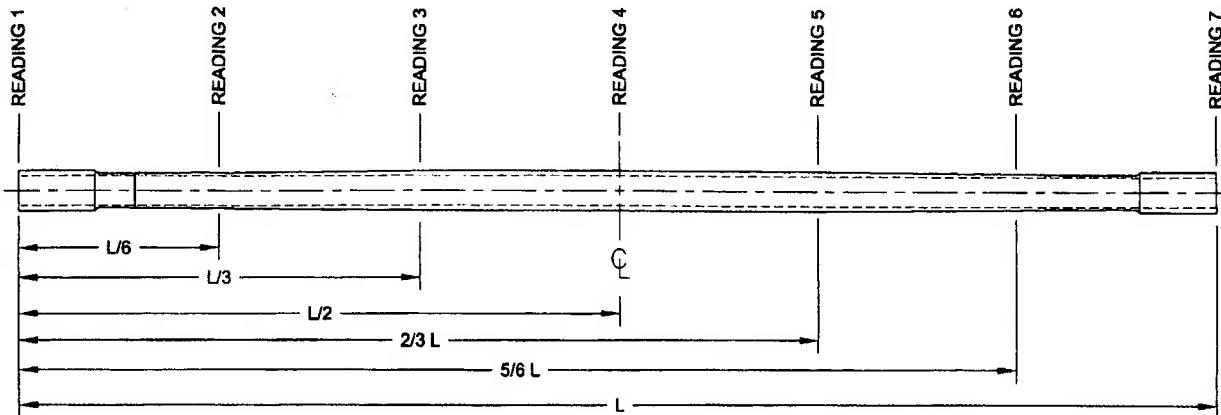
| | | |
|---|--------------|--------------|
| DART AEROSPACE LTD | Work Order: | 9267 |
| Description: Crosstube Assembly (205/212 Low Aft) | Part Number: | D212-664-247 |
| Inspection Dwg: D212-664-247 Rev: B | | Page 1 of 2 |

FIRST ARTICLE INSPECTION CHECKLIST

| Inspection Sheet Drawing Dimension | Tolerance | Actual Dimension | Accept | Reject | Method of Inspection | Comments |
|------------------------------------|-----------|------------------|---------|--------|----------------------|----------|
| SIDE A | 0.438 | +/-0.010 | 4.38 | - | vern | curc-8 |
| | 2.680 | +0.005/-0.000 | 2.683 | / | | |
| | 2.680 | +0.005/-0.000 | 2.685 | - | | |
| | 2.687 | +0.005/-0.000 | 2.692 | - | | |
| | 2.802 | +0.005/-0.000 | 2.807 | / | | |
| | 2.906 | +0.005/-0.000 | 2.911 | / | | |
| | 3.009 | +0.005/-0.000 | 3.012 | / | | |
| | 3.112 | +0.005/-0.000 | 3.115 | / | | |
| | 3.250 | +0.005/-0.000 | 3.250 | / | | |
| SIDE B | 0.438 | +/-0.010 | 4.38 | / | vern | curc-08 |
| | 2.680 | +0.005/-0.000 | 2.683 | - | | |
| | 2.680 | +0.005/-0.000 | 2.685 | - | | |
| | 2.687 | +0.005/-0.000 | 2.692 | - | | |
| | 2.802 | +0.005/-0.000 | 2.807 | - | | |
| | 2.906 | +0.005/-0.000 | 2.911 | / | | |
| | 3.009 | +0.005/-0.000 | 3.012 | / | | |
| | 3.112 | +0.005/-0.000 | 3.116 | / | | |
| | 3.250 | +0.005/-0.000 | 3.250 | / | | |
| | 128.268 | +/-0.030 | 128.060 | / | tape | L-G-22 |

| | | |
|---|--------------|--------------|
| DART AEROSPACE LTD | Work Order: | |
| Description: Crosstube Assembly (205/212 Low Aft) | Part Number: | D212-664-247 |
| Inspection Dwg: D212-664-247 Rev: B | | Page 2 of 2 |

WALL THICKNESS MEASUREMENT



| Location | WALL THICKNESS MEASUREMENT (IN) | | | | Deviation Δw (max-min) | TOLERANCE |
|----------------------|---------------------------------|------|------|------|--------------------------------------|-----------|
| | w1 | w2 | w3 | w4 | | |
| READING 1 L= 0" | .164 | .158 | .159 | .164 | .006 | |
| READING 2 L= 16 | .167 | .182 | .182 | .170 | .015 | |
| READING 3 L= 32 | .295 | .325 | .332 | .303 | .037 | |
| READING 4 L= 64 | .442 | .448 | .447 | .443 | .006 | 0.054" |
| READING 5 L= 32 | .317 | .321 | .308 | .308 | .013 | |
| READING 6 L= 16 | .164 | .192 | .186 | .157 | .035 | |
| READING 7 L= cuff | .163 | .170 | .165 | .152 | .018 | |

Calibration Result

Actual Block Thickness: .100 - .750

Sitescan 250 Measured Thickness: .100 - .750

| | | | | | |
|--------------|-----------------|-------------|-----------------|-----------------------|--|
| Measured by: | <u>MM</u> | Audited by: | <u>JW</u> | Preliminary Approval: | |
| Date: | <u>12/11/07</u> | Date: | <u>12-11-08</u> | Date: | |

| Rev | Date | Change | Revised by | Approved |
|-----|----------|------------------------------|------------|--------------------|
| A | 08.11.07 | New Issue (P/O D212-664-207) | KJ/EC | |
| B | 10.04.01 | Dwg Rev updated | KJ | |
| C | 10.08.03 | Dimension 128.268 was 128.27 | KJ | |
| D | 12.06.04 | Wall thickness form added | KJ | <u>JW</u> <u>M</u> |

8 7 6 5 4 3 2 1

B

| Item | Qty -247 | Qty -247B | Part Number | Description |
|------|----------|-----------|-------------------|---|
| 1 | X | | D212-664-247 | CROSSTUBE ASSEMBLY (205/212 LOW AFT) |
| 2 | | X | D212-664-247B | CROSSTUBE ASSEMBLY (214 LOW AFT) |
| 3 | 1 | 1 | D6008-132 | CROSSTUBE |
| 4 | 2 | 2 | D2940-1 | SUPPORT |
| 5 | 4 | 4 | D3595-063-530 | RUBBER CUSHION |
| 6 | 2 | 2 | D3660-1 | CUFF |
| 7 | 4 | 4 | MS21920-28 | CLAMP (OR MS21920-30) |
| 8 | 44 | 44 | CR32124-06 | RIVET (OR M78853-4-06) |
| 9 | A/R | A/R | MAGNOBOND 6398 | ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE) |
| 10 | A/R | A/R | SIKAFLEX-241/-291 | SEALANT (OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT) |

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6008-132
FINISHED LENGTH = 128.268±0.20 (BEFORE BENDING/TRIMMING)
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE FOR DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES .005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D212-664-XXX" AND BATCH NUMBER ON INSIDE OF CUDD USING VIBRATING STYLUS
- 7) WEIGHT: D212-664-247 = 36.6 lbs (PER IIN-D212-664)
D212-664-247B = 36.6 lbs (PER IIN-D212-664)
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) WHEN MACHINING TAPER, RUN CUTTER OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D., EXCEPT UP TO 10% IS ALLOWED IN AREA NOTED.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2940-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2940-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 13) INSTALL MS21920-28 CLAMPS (OR -30) WITH D3595-063-530 RUBBER CUSHIONS TO SECURE THE D2940-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE OF CROSSTUBE SUPPORT.
- 14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 15 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.
- 16) INSTALL D3660-1 CUDD AFTER CHEMICAL CONVERSION COAT BUT BEFORE PAINT, WITH A LAYER OF SIKAFLEX-241/-291 OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT BETWEEN CUDD AND CROSSTUBE. SEAL EDGE OF CUDD TO ENSURE NO GAPS.
- 17) TOUCH-UP HOLES WITH CHEMICAL CONVERSION COAT.

DEO ATTACHED

I-614

11.07.28

UNDER REVIEW

Q1 2013

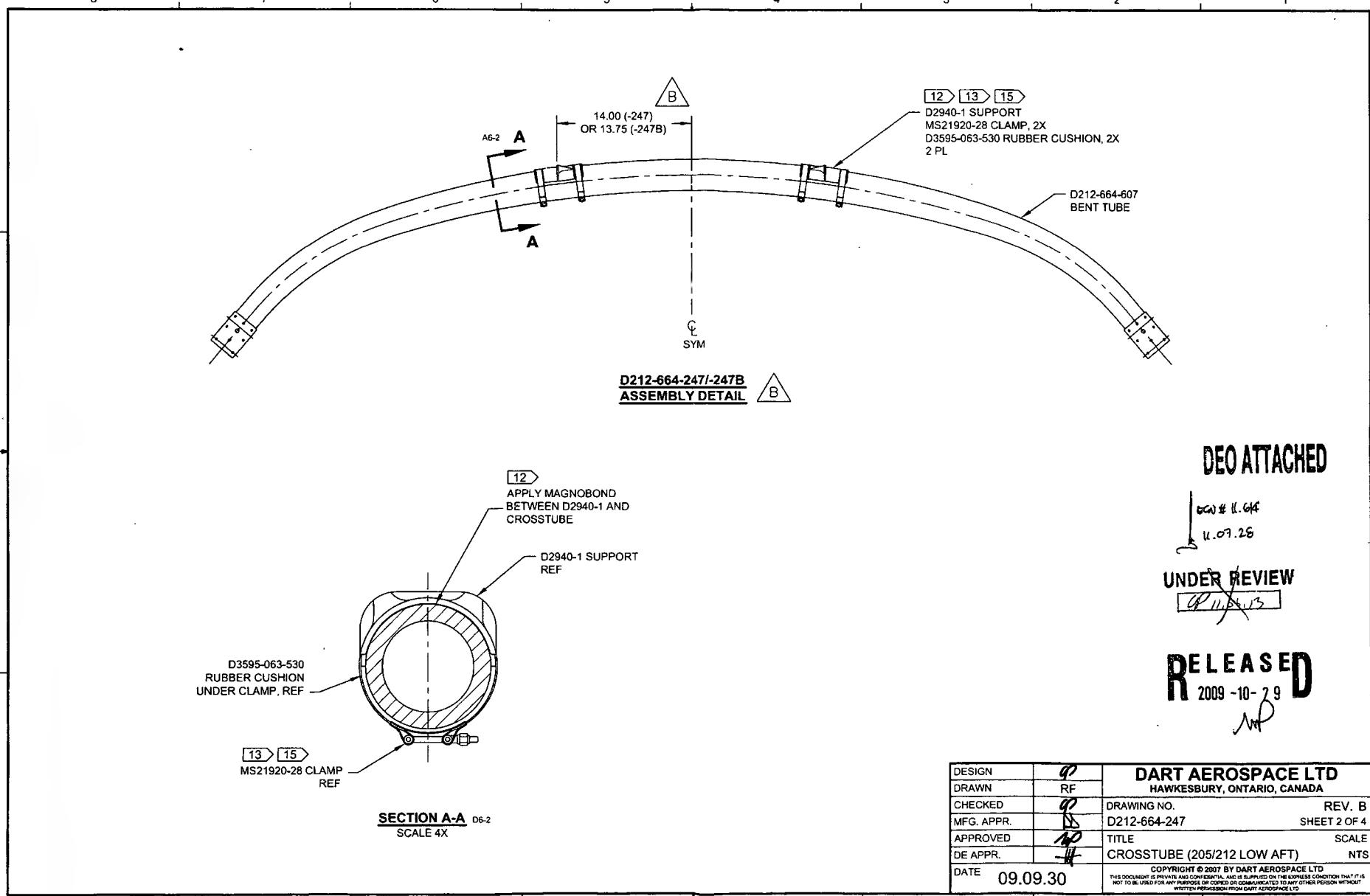
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2009-10-29

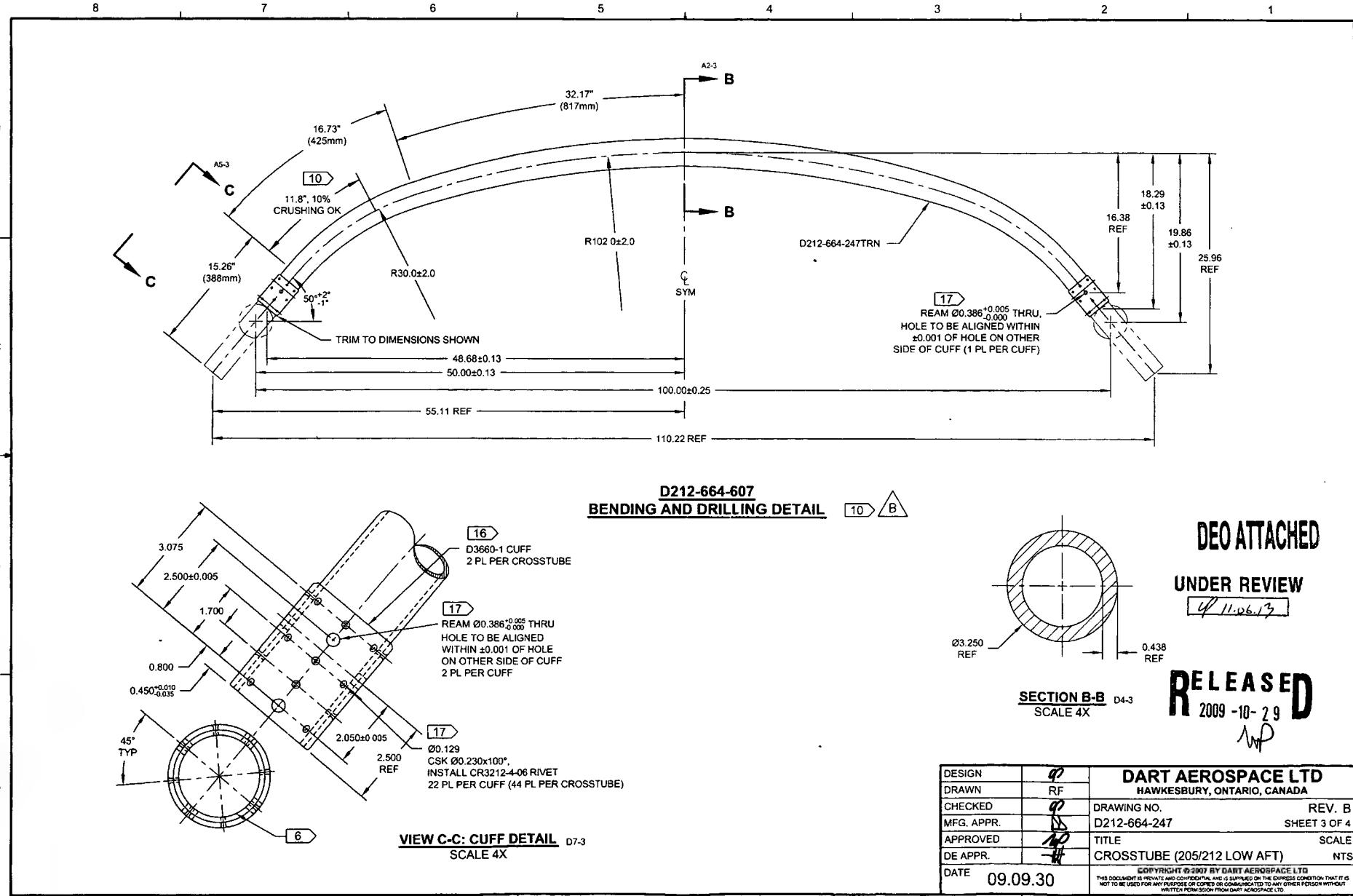
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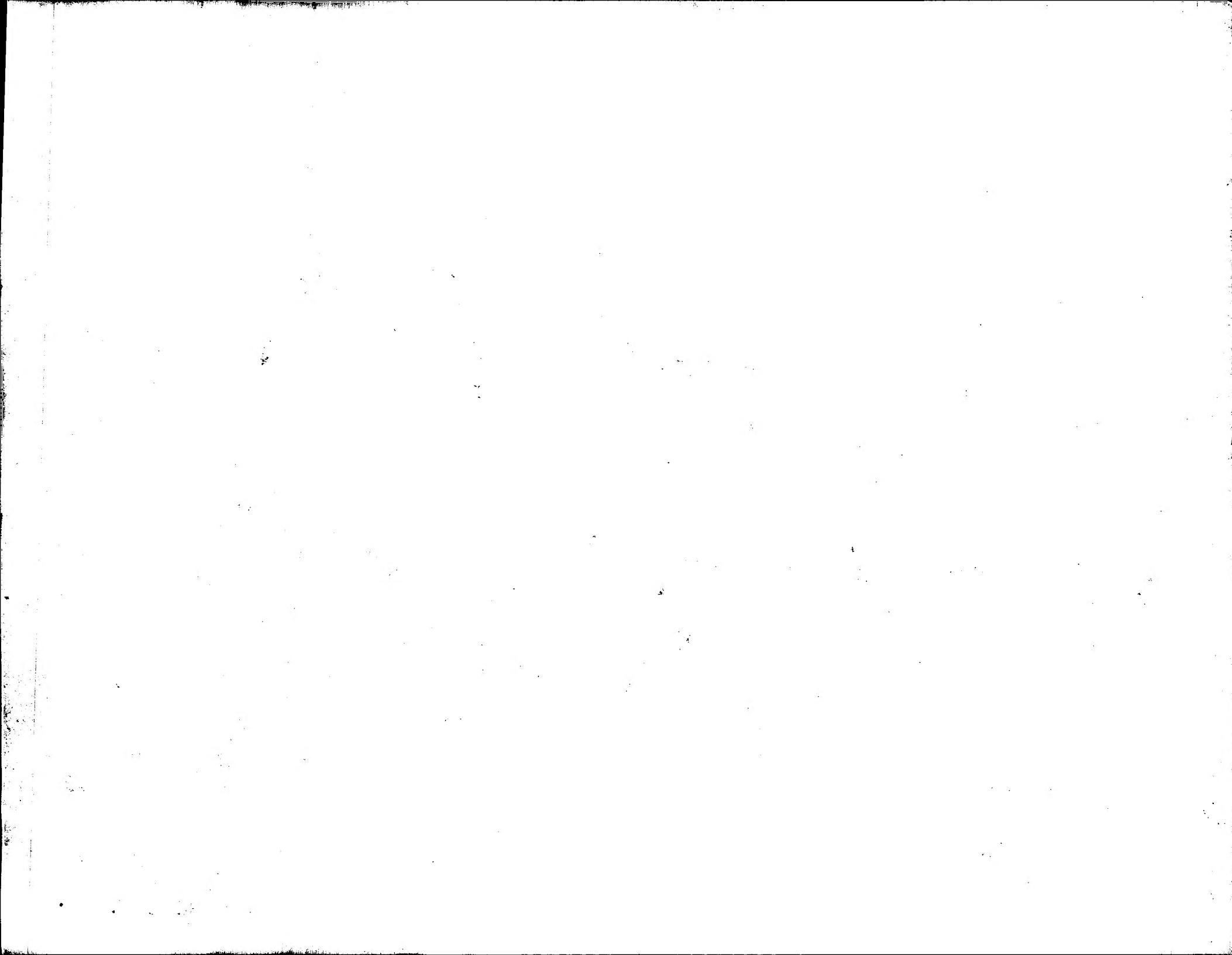
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|------------|--|--|--------------|----------|
| B | REVISE GENERAL NOTES/PART LIST; UPDATE TO CURRENT STANDARDS: ADD -247B (ZN C4-2, D5-2) | | RF | 09.09.30 |
| A | NEW ISSUE | | CP | 07.07.07 |
| REV. | DESCRIPTION | | BY | DATE |
| DESIGN | 99 | DART AEROSPACE LTD | | |
| DRAWN | RF | HAWKESBURY, ONTARIO, CANADA | | |
| CHECKED | 99 | DRAWING NO. | REV. B | |
| MFG. APPR. | IV | D212-664-247 | SHEET 1 OF 4 | |
| APPROVED | 100 | TITLE | SCALE | |
| DE APPR. | 100 | CROSSTUBE (205/212 LOW AFT) | NTS | |
| DATE | 09.09.30 | COPYRIGHT © 2007 BY DART AEROSPACE LTD. THIS DOCUMENT IS THE PROPERTY OF DART AEROSPACE LTD. IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD. | | |

8 7 6 5 4 3 2 1

A







8 7 6 5 4 3 2 1

D

D

C

C

C

C

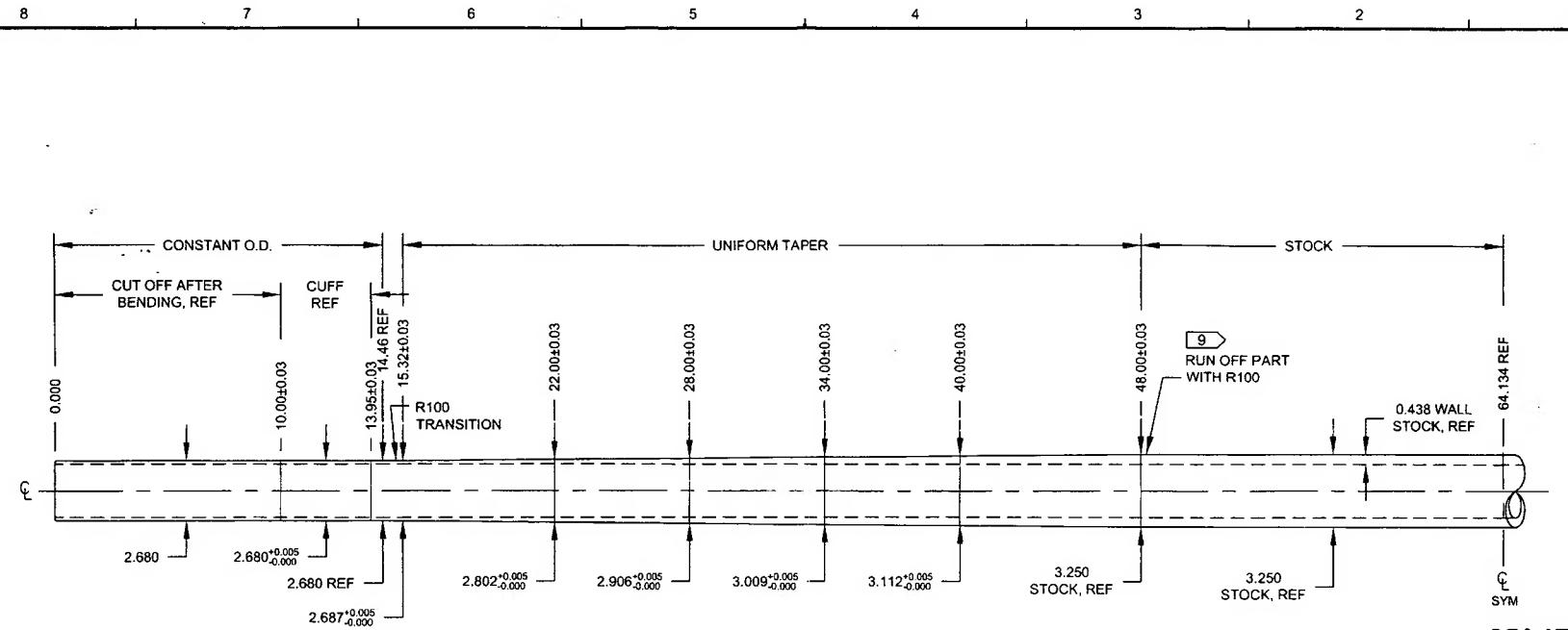
B

B

A

A

8 7 6 5 4 3 2 1



D212-664-247TRN
TURNING DETAIL

600 H11-64
11.09.28
~~UNDER REVIEW~~
OP 1.05.13

RELEASED
2009-10-29
M

| | | | |
|------------|-----------|-----------------------------|-------|
| DESIGN | <i>DP</i> | DART AEROSPACE LTD | |
| DRAWN | RF | HAWKESBURY, ONTARIO, CANADA | |
| CHECKED | <i>DP</i> | DRAWING NO. | |
| MFG. APPR. | <i>DP</i> | D212-664-247 | |
| APPROVED | <i>DP</i> | TITLE | SCALE |
| DE APPR. | <i>DP</i> | CROSSTUBE (205/212 LOW AFT) | |
| DATE | 09.09.30 | NTS | |

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| | | | | | | |
|-----------------------------|--|----------------------|---|--------------------------------|---------------------------|--------------|
| DRAWING NO. D212-664-247 | TITLE CROSSTUBE ASS'Y (205 LOW AFT) | REV. B | DART AEROSPACE LTD ENGINEERING ORDER | D.E.O. NO. D212-664-247-B-1 | SHEET NO. SHEET 1 OF 1 | SCALE NTS |
| DRAWN <i>RP</i> | CHECKED <i>ASS</i> | MFG. APPR. <i>RS</i> | APPROVED <i>W</i> | DE APPR. <i>W</i> | | |
| DATE 11.07.15 | DATE 11.07.20 | DATE 11.07.21 | DATE 11.07.21 | DATE 11.07.21 | DATE 11.07.21 | |

PURPOSE:

REPLACE MAGNOBOND WITH PROSEAL.

CHANGE:

IS:

| Item | Qty -247 | Qty -247B | Part Number | Description |
|------|-------------|--------------|-----------------|-------------------------------|
| 9 | A/R | A/R | PROSEAL 890 B-2 | SEALANT, AMS-S-8802 CLASS B-2 |

WAS:

| | | | | |
|---|-----|-----|----------------|---|
| 9 | A/R | A/R | MAGNOBOND 6398 | ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE) |
|---|-----|-----|----------------|---|

NOTE 12 & 15, SHEET 1 IS AMENDED AS FOLLOWS:

IS:

12) TO INSTALL D2940-1 SUPPORT: ABRADE MATING SURFACE OF SUPPORT AND CROSSTUBE WITH 180-GRIT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT). APPLY A 0.04" TO 0.07" THICK LAYER OF PROSEAL 890 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATING SURFACE OF SUPPORT.

15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 890 SEALANT HAS CURED FOR 72 HOURS.

WAS:

12) INSTALL D2940-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2940-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.

15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

RELEASED
2011-07-29
W

